

# SOME UPPER JURASSIC AMMONITES OF THE GENUS *RASENIA* FROM SCOTLAND

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ABSTRACT. Three species (one of them new) of the ammonite genus *Rasenia* from the Lower Kimeridgian of Eathie (Scotland) are described. They are of interest as being probable ancestors to different species of the one genus *Aulacostephanus*.

FOR the preparation of a monograph on the Upper Jurassic ammonite genus *Aulacostephanus* (Ziegler 1962) it was necessary to study much material from the whole of central and Western Europe. For this purpose, Dr. C. D. Waterston, Edinburgh, had the kindness to send me some specimens from the Lower Kimeridgian of Eathie (Ross-shire, Scotland). Since one of the species contained in this material was hitherto unknown and of special interest as being ancestral to some *Aulacostephanus*, it seems useful to describe the ammonite fauna briefly.

I am much indebted to Dr. C. D. Waterston for sending me the material, and to Dr. J. H. Callomon, London, and Dr. O. F. Geyer, Stuttgart, for much advice, help, and discussion. The photographs were made by Mr. J. Aichinger, Zürich. In translating the text, I was assisted by Dr. M. Schnitter and Mr. A. Somm, Zürich.

The specimens studied are part of the Hugh Miller Collection of the Royal Scottish Museum, Edinburgh. They were collected, together with other ammonites, during the last century. Stratigraphical data therefore are not given. They seem, however, to come from the limestones described by C. D. Waterston (1951) as belonging to the *walensis* Zone.

All the specimens are perfectly preserved. Often even the shell, though recrystallized, is present. The phragmocones are usually filled with white crystals of calcium carbonate; the body-chamber, however, is filled with sediment. Since parts of the body-chambers are crushed, the peristomes are never preserved. Sometimes the ammonites are accompanied by other fossils (such as *Meleagrinella* and *Buchia*).

## SYSTEMATIC DESCRIPTIONS

The ammonites are characterized by short primary, and long fine secondary, ribs crossing the venter. These features permit their classification as members of the genus *Rasenia*. Within this genus Geyer (1961) distinguishes six subgenera. Three of them (*Rasenia* s.str., including *Zonovia*, *Eurasenia*, and *Prorasenia*) bear coarse and/or sharp ribs, a fourth (*Involuticeras*) is very involute with a rather steep umbilical slope. Our ammonites, on the contrary, are finely ribbed, slightly involute to evolute and possess a gentle umbilical slope. Therefore they must be placed with the subgenera *Rasenioides* and/or *Semirasenia*.

According to Geyer a small shell is characteristic of *Rasenioides* (type: *A. striolaris*); some species (if not all) bear lappets on the peristome. Thus *Rasenioides* is a microconch (Callomon 1955). *Semirasenia*, on the other hand, seems to be a macroconch. The shell of the type species is, however, also of small size. Although its peristome is not known, it is quite probably devoid of any lappet, since the derivatives of *Semirasenia* (the subgenus *Aulacostephanoides*) do not bear lappets.

Geyer emphasizes the late appearance of the primary ribs in *Semirasenia* (in *S. möschi* the umbilical parts of the whorls remain smooth up to the body-chamber). This feature does not necessarily seem to imply subgeneric rank. Experience with the closely related genus *Aulacostephanus* shows very great variation in the appearance of the primaries.

Summarizing, it may be justifiable to classify all apparently macroconch species of *Rasenia*, with fine ribs and gentle umbilical slopes, with the subgenus *Semirasenia*. However, there is no proof or phylogenetic justification for this procedure. Since the British *Rasenia* have not been monographed it is impossible to draw lineages in any other ways than merely on morphological and arbitrary grounds.

### *Rasenia* (*Rasenioides*) *lepidula* (Oppel)

Plate 111, figs. 1–7

1863 *Ammonites lepidulus* Oppel, p. 242, pl. 67, fig. 4.

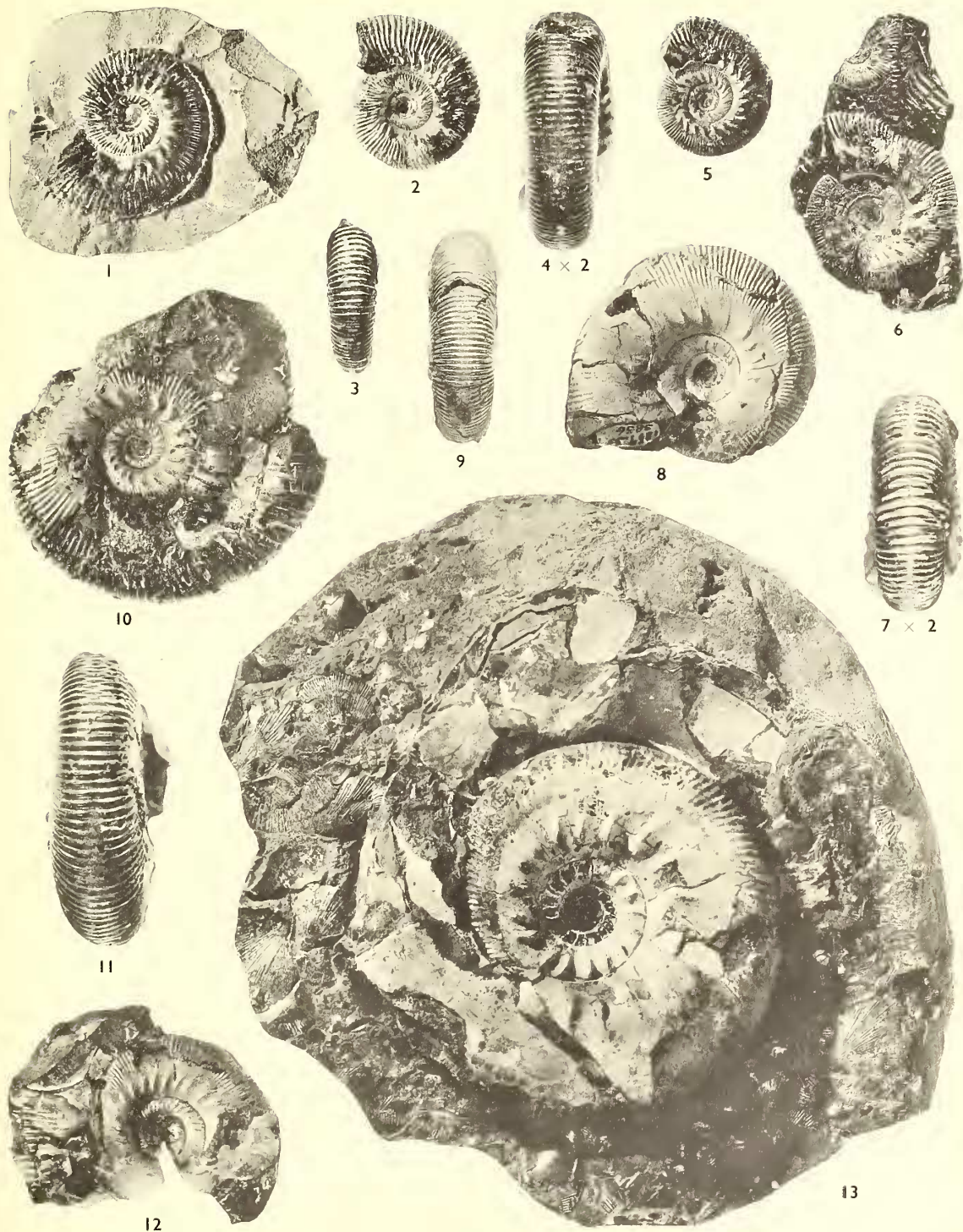
1961 *Rasenia* (*Rasenioides*) *lepidula* (Oppel 1863), Geyer, p. 112, pl. 8, figs. 5, 6.

The small shell does not exceed approximately 40 mm. in size. The body-chamber (bearing lappets at the peristome, but only partly preserved in our specimens) is about two-thirds to three-quarters of a whorl in length. The maximum diameter of the phragmocone, therefore, is about 25 mm. However, the majority of our specimens from Scotland being somewhat smaller, the diameter of the phragmocone averages about 20 mm. Often the last two or three septa are approximated (see Pl. 111, fig. 1). This may be considered a feature of adulthood.

Our shells are slightly evolute (in contrast to Geyer's statement for his central Euro-

#### EXPLANATION OF PLATE 111

- Figs. 1–7. *Rasenia* (*Rasenioides*) *lepidula* (Oppel); Lower Kimeridgian, *uralensis* Zone; Eathie, Ross-shire, Scotland. 1, Natural size. Diameter of the phragmocone 19 mm. Royal Scottish Museum, Department of Geology, 1859.33.3844. 2, Natural size. Diameter of the phragmocone 18.5 mm., 1859.33.3858. 3, Natural size. Ventral view. 1859.33.3858. 4,  $\times 2$ . Ventral view, secondary ribs diminishing in height, 1859.33.3853. 5, Natural size. Diameter of the phragmocone 15.8 mm., 1859.33.3853. 6, Natural size. Diameter of the phragmocone 28 mm. 1859.33.3859. 7,  $\times 2$ . Ventral view, secondary ribs interrupted by a narrow median ledge on the internal side of the shell. 1859.33.3857.
- Figs. 8–9. *Rasenia* (*Semirasenia*) cf. *möschi* (Oppel); Lower Kimeridgian, *uralensis* Zone; Eathie, Ross-shire, Scotland. Royal Scottish Museum, Department of Geology, 1859.33.3856. Natural size. 8, Lateral view, diameter of the phragmocone 35 mm. 9, Ventral view.
- Figs. 10–13. *Rasenia* (*Semirasenia*) *askepta* sp. nov.; Lower Kimeridgian, *uralensis* Zone; Eathie, Ross-shire, Scotland. All natural size. 10, Diameter of the phragmocone about 35 mm. (?). Royal Scottish Museum, Department of Geology, 1859.33.3846. 11, Same ventral view. 12, Diameter of the phragmocone about 33 mm. (?). 1859.33.3850. 13, Diameter of the phragmocone 59 mm., length of the body-chamber (crushed) more than three-quarters whorl. 1859.33.3845. Accompanying fossils: *Meleagrinnella leeana* Waterston and *Buchia concentrica* (Sowerby).





pean material). The lateral parts of the whorls are nearly flat (at least on the outer whorls), and the venter is rounded. The umbilical slope in the phragmocone and the body-chamber is gentle. As a whole the whorl section is oval.

Around the umbilicus, but somewhat removed from the umbilical seam, there are narrow, sharp but low, prorsicostate primaries. They split into rather dense, radial secondaries. These secondaries cross the venter. Only occasionally is there observed a narrow ledge in the middle of the venter on the internal surface of the shell. This ledge points to a developmental trend leading to *Aulacostephanus*. The tendency is for the siphuncle to sink more and more into the interior of the whorl. The aforesaid narrow ledge is the first step; the second step is a clear interruption of the ribs in some parts of the venter; the third step is the interruption on the whole of the venter; and the last step is a real furrow as in *Aulacostephanus eudoxus*.

*Measurements:*

<i>Specimen number</i>	<i>Diameter (mm.)</i>	<i>Height of whorl</i>	<i>Whorl width</i>	<i>Umbilical diameter</i>	<i>Number of primaries (at a diameter of 20 mm.)</i>	<i>Number of secondaries (at a diameter of 20 mm.)</i>
1859.33.3858	26 18	36 37	32 33	36 37	26	86 (3·3)
1859.33.3844	28·4 23	34 35		39 39	24	78 (3·25)
1859.33.3853	21·7	36	35	41	26	102 (4·4)
1859.33.3857	18	39	38	37	30	80 (2·7)
1859.33.3859	29	35	31	39	20	108 (5·4)

(at a diameter of 30 mm.)

Our specimens differ slightly from the material from central Europe described by Geyer (1961). The shells are more evolute, the number of primaries at the diameter of 20 mm. is greater, and therefore the ratio of primaries to secondaries is not the same. Most likely this is not due to specific (or subspecific) differences, but to the small number of specimens studied.

*Rasenia (Semirasenia) cf. möschi* (Oppel)

Plate 111, figs. 8-9

cf. 1863 *Ammonites Möschi* Oppel, p. 240, pl. 65, fig. 2.

cf. 1961 *Rasenia (Semirasenia) moeschi* (Oppel 1863), Geyer, p. 105, pl. 8, figs. 7, 8.

According to Geyer the medium size in *Rasenia möschi* is less than 70 mm. If we assume the body-chamber to be nearly a whorl in length (Oppel 1863) the mean diameter of the phragmocone would be about 30 mm. Our specimens fit these measurements quite well. Two individuals show the end of the phragmocone at 33 and 35 mm. respectively. In other specimens (most likely immature ones) the body-chamber begins at 23 and 21 mm. respectively. The shells are involute. As in *Rasenia lepidula* the umbilical slope is very gentle. The lateral parts of the whorl are very slightly vaulted, the venter is rounded.

In our specimens no peristome is preserved; but, as mentioned above, it is probable that no lappets are present. The body-chamber seems to comprise nearly a complete whorl. In our specimens, however, only the beginning of the body-chamber is to be seen.